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10/559,779	12/07/2005	Arno Lange	281111US0PCT	5923
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
HUHN, RICHARD A				
ART UNIT		PAPER NUMBER		
1796				
NOTIFICATION DATE		DELIVERY MODE		
04/08/2009		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com

oblonpat@oblon.com

jgardner@oblon.com

Office Action Summary

Application No.

10/559,779

Applicant(s)

LANGE ET AL.

Examiner

RICHARD A. HUHNS

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☒ Claim(s) 1 and 3 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/ISD)
- Paper No(s)/Mail Date 7 Dec 2006

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

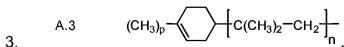
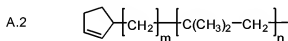
DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because it is insufficient in length. The abstract should be from 50 to 150 words in length. Applicant is reminded not to add content which may be considered new matter. Correction is required. See MPEP § 608.01(b).

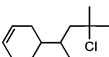
Claim Objections

2. Claim 1 objected to because of the following informalities: the formulas A.2 and A.3 are ambiguous in that they may imply that the ring can be part of the repeating alkylene unit. It is recommended that the formulas in the specification and claims be modified to the following to avoid ambiguity:



4. Claim 1 is further objected to because it is not clear that the values of k pertain to both A1 and to A2 and A3. This ambiguity can be removed by moving the values of k to prior to the recitation of the values of m, n, and p, such that the values of k do not immediately follow the recitation of the values of m, n, and p for the groups A2 and A3.

5. Claim 3 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The penultimate compound recited, 2-chloro-2-methyl-4-(cyclohexen-4-yl)pentane, shown below, does not fall within

the scope of base claim 1: .

6. Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 3-7, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent Application Publication No. 2003/0065098 (herein "Puskas").

9. As to claims 1 and 9: Puskas discloses a method of preparing polymers which comprises polymerizing isobutene (see paragraph 49) in the presence of a Lewis acid (see paragraphs 24 and 56) and a monomer according to instant formula (I) in which the group A is group A.1 in which $m=1$, $n=1$, and $k=0$ or 1 (see paragraph 41 and the second page of Fig. 5).

10. As to claim 3: Puskas further discloses the use of the monomer 3,3,5-trimethyl-5-chloro-1-hexene, which is identical to the presently recited monomer 2-chloro-2,4,4-



3,3,5-trimethyl-5-chloro-1-hexene

trimethyl-5-hexene, shown here: 2-chloro-2,4,4-trimethyl-5-hexene.

11. As to claim 4: Puskas further discloses that the Lewis acid may be boron trichloride (see paragraph 56).
12. As to claims 5 and 6: Puskas further discloses the use of electron donors such as amides (see paragraph 59).
13. As to claim 7: Puskas further discloses the termination of the polymerization with a protic compound such as methanol (see Example 1 in paragraph 65).
14. In view of this discussion, it is evident that claims 1, 3-7, and 9 stand anticipated by Puskas.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

17. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Puskas, as applied above, in view of Polymer Bulletin 1985, 13, 435-439 (herein "Mishra").

18. The discussion with respect to Puskas as set forth above in paragraphs 9-13 is incorporated here by reference. Puskas fails to disclose the treatment of the polymer with base or heat. As applied above, Puskas teaches termination of the polymerization with a protic compound such as methanol.

19. Mishra teaches that halogen-terminated isobutylene polymers may be treated with base to give alkene-terminated polymers via a dehydrohalogenation reaction (see Summary on page 435). A person of ordinary skill in the art would know that methoxy-terminated alkyl groups, such as the polymers of Puskas, may undergo an elimination reaction analogous that of dehydrohalogenation upon exposure to heat or base, as presently claimed. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the present invention to have treated the polymer described by Puskas with heat or base in order to prepare an alkene-terminated polymer, because Mishra teaches that alkene-terminated polymers may be prepared via an analogous dehydrohalogenation procedure.

20. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Puskas, as applied above, in view of US Patent No. 5,066,730 (herein "Kennedy").

21. The discussion with respect to Puskas as set forth above in paragraphs 9-13 is incorporated here by reference. Puskas fails to disclose reaction of polyisobutene with a conjugated diene, as presently recited. However, it is within the ordinary level of skill in the art to prepare copolymers with convention monomers, and it is well known to copolymerize isobutene with conjugated dienes such as butadiene or isoprene. For example, Kennedy teaches that isobutene may be copolymerized with conjugated dienes such as butadiene or isoprene (see col 6 line 67). It would have been obvious to a person of ordinary skill in the art at the time of the present invention to have to use a conjugated diene monomer for the polymerization of Puskas because Kennedy teaches that isobutene may be copolymerized with conjugated dienes, and because copolymerizations of isobutene and conjugated dienes are well known in the art.

22. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Puskas, as applied above, in view of US Patent No. 5,677,386 (herein "Faust") and further in view of Mishra.

23. The discussion with respect to Puskas and Mishra as set forth above in paragraphs 9-13, 18, and 19 is incorporated here by reference. Puskas fails to disclose the coupling of polymer chains with the coupling agents presently recited. However,

Puskas teaches that the polymers described therein are useful for block copolymers (see abstract).

24. Faust teaches that coupling agents such as 1,1-diphenylethylene may be used to couple isobutylene polymers (see col 2 lines 11-20) and to prepare block copolymers (see col 1 line 14). Faust teaches that after treatment with 1,1-diphenylethylene, the polymer terminus is reacted with methanol. Mishra teaches that halogen-terminated isobutylene polymers may be treated with base to give alkene-terminated polymers via a dehydrohalogenation reaction (see Summary on page 435).

25. It is within the ordinary level of skill in the art to use known coupling procedures to prepare block copolymers. Furthermore, a person of ordinary skill in the art would know that methoxy-terminated alkyl groups may undergo an elimination reaction analogous that of dehydrohalogenation upon exposure to heat or base, as presently claimed. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the present invention to have modified the method of Puskas by using a coupling agent according to Faust, including 1,1-diphenylethylene as presently recited, to prepare block copolymers. Furthermore, it would have been obvious to a person of ordinary skill in the art at the time of the present invention to have treated such a polymer with heat or base in order to prepare an alkene-terminated polymer, because Mishra teaches that alkene-terminated polymers may be prepared via an analogous dehydrohalogenation procedure.

26. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Puskas, as applied above, in view of US Patent No. 5,690,861 (herein "Faust-861")

27. The discussion with respect to Puskas as set forth above in paragraphs 9-13 is incorporated here by reference. Puskas fails to disclose the coupling of polymer chains with the coupling agents presently recited. However, Puskas teaches that the polymers described therein are useful for block copolymers (see abstract).

28. Faust-861 teaches that coupling agents such as those presently recited in claim 13(iii) may be used to couple isobutylene polymers (see col 1 lines 45-65). It is within the ordinary level of skill in the art to use known coupling procedures to prepare block copolymers. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the present invention to have modified the method of Puskas by using a coupling agent according to Faust-861, including the bis(vinylidene) compounds as presently recited, to prepare block copolymers, thereby arriving at the present invention.

29. Claims 2 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Puskas, as applied above, in view of German Patent Application DE 10232157 (herein "Lang"). (An English equivalent of Lang, US Patent No. 7,001,966, is referred to herein). (Applicant provided the WIPO document corresponding to Lang, WO 03/074577).

30. The discussion with respect to Puskas as set forth above in paragraphs 9-13 is incorporated here by reference. As applied above in paragraph 9, Puskas discloses monomers according to instant formula A.1. Puskas fails to disclose the monomers according to instant formulas A.2, A.3, and A.3.1.

31. Lang discloses cyclopentenyl and cyclohexenyl compounds which are analogous to the presently claimed monomers (see formula (I) at col 1 line 45), and which may be copolymerized with isobutene (see col 1 line 38) using Lewis acid catalysts (see col 2 line 11). When instant formulas A.2, A.3, and A.3.1 are chosen such that $k=m=n=p=0$, the structural difference between the presently claimed monomers and the monomers disclosed by Lang is the presence of an isopropylidene group which separates the cycloaliphatic ring from the group X.

32. It is within the ordinary level of skill in the art to prepare analogous compounds which are used for the same purpose (see MPEP 2144.09). A person of ordinary skill would expect that the modification of the monomers disclosed by Lang with any simple aliphatic groups would lead to monomers which function in an equivalent manner for copolymerization with isobutene and produce equivalent and analogous desired end results for the polymer. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the present invention to have prepared analogues of the monomers of Lang, including monomers according to the instant formulas A.2, A.3, and A.3.1, and to have used them in the manner disclosed by Lang, thereby arriving at the present invention.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RICHARD A. HUHN whose telephone number is (571)

270-7345. The examiner can normally be reached on Monday to Friday, 7:30 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. A. H./
Examiner, Art Unit 1796

/Vasu Jagannathan/
Supervisory Patent Examiner, Art Unit 1796